

METRIC/U.S. CUSTOMARY

KSC-SPEC-P-0016A

October 1992

Supersedes

KSC-SPEC-P-0016

June 1986

**MINIMUM REQUIREMENTS FOR
GARMENT SNAP FASTENER
SPECIFICATION FOR**

**SAFETY, RELIABILITY AND QUALITY ASSURANCE
DIRECTORATE**

KSC-SPEC-P-0016A

October 1992

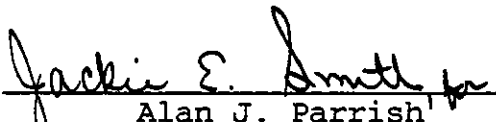
Supersedes

KSC-SPEC-P-0016

June 1986

**MINIMUM REQUIREMENTS FOR
GARMENT SNAP FASTENER
SPECIFICATION FOR**

APPROVED BY:



Alan J. Parrish
Director, Safety, Reliability
and Quality Assurance

JOHN F. KENNEDY SPACE CENTER, NASA

MINIMUM REQUIREMENTS FOR
GARMENT SNAP FASTENER
SPECIFICATION FOR

1. SCOPE

This specification and procedure will apply to all protective clothing snap fastener applications designated for use at Kennedy Space Center, Florida. It will also establish a uniform procedure and specification to ensure that snap fastener applications are consistent with good manufacturing practices and functions as intended.

2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitations, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/State of Work/Contract.

2.1 Manufacturer Standards.

Scovill Manufacturing Company

The standards applicable to "Gripper" snap fasteners provided by Scovill Manufacturing are specified in Appendix A to this document.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specified procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

3. REQUIREMENTS

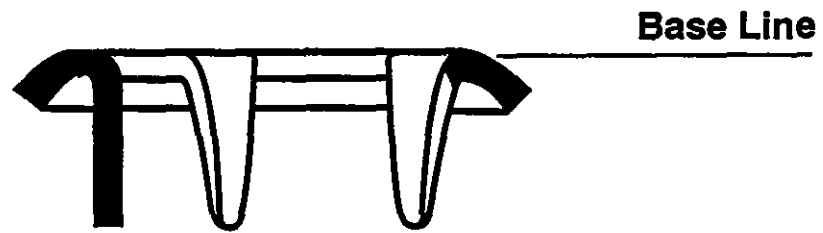
3.1 Definitions.

3.1.1 Gripper[®]. - A registered trademark of the Scoville Manufacturing Company referring to a snap fastener.

3.1.2 Snapper[®]. - A registered trademark of the Dot Division of TRW, Inc. referring to a snap fastener.

- 3.1.3 Pinch. - Refers to thickness of assembled ring/socket, stud/post, or stud/ring components.
- 3.1.4 Basic Pinch. - Thickness of assembled component when set without fabric.
- 3.1.5 Compressed Foundation Thickness. - Thickness of fabric and any reinforcement of snap fastener attachment measured under a specified pressure (compression).
- 3.1.6 Setting Pinch. - Basic pinch plus compressed foundation thickness.
- 3.1.7 Overset. - Setting pinch is too tight.
- 3.1.8 Underset. - Setting pinch is too loose.
- 3.1.9 Snap Action. - The amount of force required to snap or unsnap a snap fastener. Variously described as hard, easy, or standard.
- 3.2 Characteristics. - Performance and physical characteristics are specified in this section.
 - 3.2.1 Physical Characteristics. See Figure 1.
 - 3.2.1.1 Socket. - The socket is the female functional part and is a cup-shaped shell with an annular chamber surrounding its mouth. The socket is attached to the fabric with a pronged ring.
 - 3.2.1.2 Pronged Ring. - A pronged ring is used to attach sockets or prong attached studs to the fabric.
 - 3.2.1.3 Stud. - The stud is the male functional part of the fastener which engages the socket. The stud is attached to the fabric with a post (or eyelet) or, in the case of a prong attached stud, a pronged ring.
 - 3.2.1.4 Post (or eyelet). - A flanged component which mates with the stud to attach the stud to the fabric.
 - 3.2.2 Performance Characteristics. - The standard limits defined in the attached Appendixes A and B describe the limits within which the snap fastener can be expected to perform satisfactorily.
 - 3.2.2.1 Tolerances. - A tolerance of +/- 0.05 mm (0.002") will apply to the standard dimensions for permissible basic pinch, compressed foundation thickness limits, and permissible setting pinch limits.

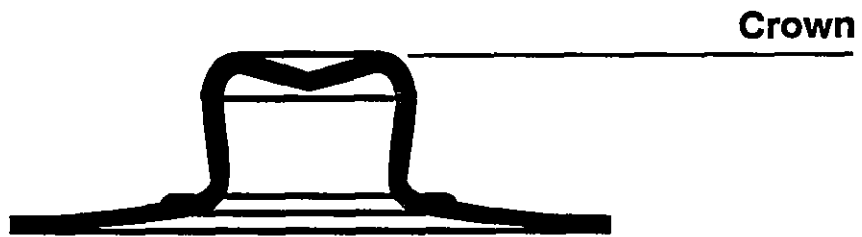
Scovill Grippers



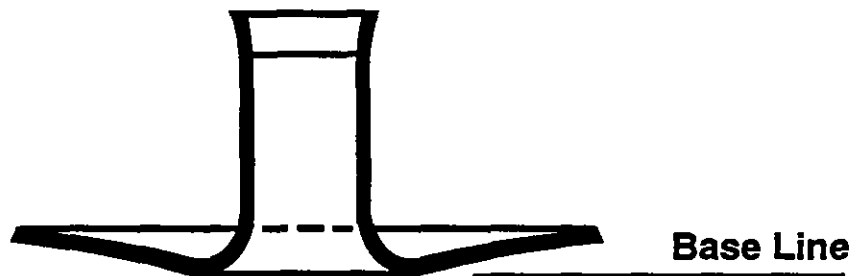
A-Prong



B-Socket



C-Stud



D-Post

Figure 1

3.2.3 Reliability.

Violation of Standard Limits. - Should any measurement of permissible compressed foundation thickness be less than or exceed the standard limits of ± 0.05 mm (0.002") tolerance, supervision must be contacted to initiate corrective action before any production is begun. Should any measurement of permissible setting pinch limits be less than or exceed the standard limits, the supervisor concerned should be contacted for immediate correction.

3.3 Design and Construction.

3.3.1 Measurement Instruments.

3.3.1.1 Micrometer. - The Constant Torque Micrometer, Model UI3006, with an anvil surface area of 32 mm² (0.05 in²) fitted with a Constant Torque attachment capable of developing 0.32 joule (newton-meter) (2.8 inch-pounds) of torque is the only approved micrometer for measuring foundation thickness under this specification.

3.3.1.2 Steel Flat. - A 2.5 mm (0.100") thick hardened steel flat, approximately 25 mm x 25 mm (1" x 1") will be utilized to provide a flat surface when measuring the basic (or setting) pinch of the prong and socket.

3.3.2 Method of Measurement.

3.3.2.1 Prong/Socket. - The flat is placed squarely against the face line of the socket. The flat, in turn, rests against the anvil of the micrometer while the face of the micrometer spindle is turned down onto the prong ring preferably between the base of the two adjacent prong legs where they join the ring. The pinch is read by subtracting 2.5 mm (0.100") for the thickness of the flat from the micrometer reading.

3.3.2.2 Stud/Post. - The anvil of the micrometer is placed against either the crown of the stud or the base line of the post barrel, whichever is most convenient. The spindle is then tightened against the corresponding part in the same manner as for the prong/socket. No flat is necessary. The setting (or basic) pinch is then read directly from the micrometer vernier.

3.3.2.3 Prong/Ring Stud. - This unit may be measured without using the flat. The anvil of the micrometer rests against the base line of the stud while the face of the micrometer spindle is turned down to contact the prong ring, preferably between the base of two adjacent prong

legs where they join the ring (in the same manner as for the prong/socket). The setting (or basic) pinch is read directly from the micrometer vernier.

- 3.3.2.4 Compressed Foundation Thickness. - The thickness of the snap fastener foundation (fabric plus reinforcement, if used) is measured at the point of the snap fastener attachment. The foundation is gradually squeezed between the face of the spindle and the anvil. The correct amount of compression is achieved by tightening the Constant Torque.
- 3.3.2.5 Specific Application Specifications. - Individual application specifications are derived by adding the compressed foundation thickness to the basic pinch. The result is the setting pinch. The setting pinch so derived becomes the specification for that particular application.

4. QUALITY ASSURANCE PROVISIONS

- 4.1 Responsibility for Inspection. - According to a predetermined schedule, the snap fastener vendor analyzes specific applications to determine if fasteners are being used as intended. This analysis should be used by the respective producing mills as a guide to set up and monitor fastener closures as specified by the in-process fastener monitoring procedure.
- 4.2 Special Tests and Inspections. - The following two examples demonstrate required calculations to determine if fasteners are used as intended.

4.2.1 Example 1:

Application: Sleeper placket, prong/socket X/16
Foundation: One ply body fabric - One ply reinforcement
Compressed Foundation Thickness: 0.5 mm (0.020")
(Falls within permissible foundation thickness limits for prong/socket standard X/16)

Basic pinch for prong/socket [standard X/16 is 2.7 mm (0.105")]

Setting pinch is:

Compressed foundation thickness: 0.5 mm (0.020")
(basic pinch) + 2.7 mm (0.105")
= 3.2 mm (0.125")
(Falls within permissible setting pinch limits)

Application specification is 3.2 mm +/- 0.05 mm (0.125" x 0.002")

4.2.2 Example 2:

Application: Shirt collar, stud/pos
Foundation: Four ply rib collar - One ply reinforcement
Compressed Foundation Thickness: 0.95 mm (0.037")
[Exceeds permissible foundation thickness limit of 0.75 mm (0.030"). Application is not permitted. Must adopt X/16 fastener or redesign the garment.]

The application is considered to be within specification if the setting pinch +/- tolerance is not exceeded.

5. PREPARATION FOR DELIVERY

The preparation for delivery shall meet the provisions required by the procurement document.

6. NOTES

Use of Grippers. - When grippers are used they shall comply with the following:

- a. Use of stainless steel grippers (snaps) must be approved by originating procurement authority.
- b. Grippers, if used, will be protected from contact with the skin.
- c. Grippers, if used, will be in accordance with this specification.
- d. Grippers, if used, will be randomly tested following machine setting in accordance with Appendix A (pinch setting test).
- e. Grippers, if used, will be pull tested in accordance with Appendix B.

NOTICE. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Custodian: NASA - John F. Kennedy Space Center

Preparing Activity: John F. Kennedy Space Center
Industrial Safety Engineering Branch
Safety Operations Engineering Division
Safety, Reliability and Quality Assurance
Directorate

APPENDIX A

STANDARDS

The following standards are applicable specifically to "gripper" stainless steel snap fasteners manufactured by Scovill.

1. Basic Pinch Measurements:

Prong/Socket = 2.3 mm (0.090")
Stud/Post = 3.8 mm (0.150")

These basic measurements are added to the thickness of the material they are being attached to and that thickness figure should be the one used for proper attachment.

2. Maximum Thickness Limits:

Prong/Socket Combination = 0.9 mm (0.035")
Stud/Post Combination = 1.0 mm (0.040"))

3. Permissible Setting Pinch Limits:

Prong/Socket = 3.2 mm (0.125")
Stud/Post = 4.8 mm (0.190")

NOTE: TOLERANCE

If points where the snaps are attached exceed the allowable setting pinch limits by more than 0.05 mm (0.002"), permanent attachment cannot be guaranteed.

APPENDIX B

"GRIPPER" SNAP FASTENER PULL TEST

- 0 For the pull test, use a 2-ply sample test strip approximately 200 mm (8") long (should be same thickness as garment in production). Set the prong/socket and stud/post in the center of the test strip.
- 0 Secure one end of test strip. Attach the other end of test strip to some measuring device. The point of separation of the two sides of the test strip should be at a minimum of 45 newtons (10 lbs). (Two sides of strip separate or fabric tears around snap fastener.)

RECOMMENDATION

Check at the beginning and end of a run of garments to qualify all snaps set in that run.